A Review of 1999 / 2000 British Columbia Herring Fisheries

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2000

Canadian Industry Report of Fisheries and Aquatic Sciences 254

Fisheries and Oceans Canada | Pêches et Océans Canada

Canada

Canadian Industry Report of Fisheries and Aquatic Sciences

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101-01824/

Canadian Industry Report of
Fisheries and Aquatic Sciences 254

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by

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Cat. No. Fs 97-14/254E ISSN 0706-3694

Correct citation for this publication:

Hamer, L., and Hepples, J. 2000. A review of 1999 / 2000 British Columbia herring fisheries. Can. Ind. Rep. Fish. Aquat. Sci. 254: vi + 51 p

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ABSTRACT

Hamer, L., and Hepples, J. 2000. A review of 1999 / 2000 British Columbia herring fisheries. Can. Ind. Rep. Fish. Aquat. Sci. 254: vi + 51 p

The Pelagic Subcommittee of PSARC recommended a biological yield of 43,508 tons for five major British Columbia herring stock assessment regions in 2000. Whole herring and / or herring spawn was harvested in the following fisheries: food, social and ceremonial; roe; spawn on kelp; winter food and bait; commercial, sport, personal use bait; charity sales; zoo and aquarium food; test fishing; and research. The 2000 coast wide roe herring quota was 28,815 tons, and 30,011 tons were caught.

key words: herring, catch, allocation

RÉSUMÉ

Hamer, L., and Hepples, J. 2000. A review of 1999 / 2000 British Columbia herring fisheries. Can. Ind. Rep. Fish. Aquat. Sci. 254: vi + 51 p

Le sous-comité pour la pêche pélagique du Comité d'examen des évaluations scientifiques du Pacifique (PSARC) a recommandé d'établir à 43 508 tonnes la productivité de cinq grandes régions de pêche au hareng de la Colombie-Britannique en 2000. Des harengs et/ou des oeufs de harengs ont été récoltés dans les secteurs de pêche suivants : pêche autochtone à buts alimentaire, social et cérémoniel; pêche des oeufs de hareng; pêche des oeufs de hareng sur varech; pêche minotière et pour les appâts; pêche commerciale, pêche sportive, pêche pour appâts à usage personnel; ventes à but caritatif; alimentation des animaux captifs (zoos et aquariums); pêche exploratoire et recherche. Le quota pancôtier de pêche au hareng rogué pour 2000 était de 28 815 tonnes, et 30 011 tonnes ont été capturées.

Mots clés : hareng, capture; allocation;

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1.0 INTRODUCTION

Herring have been one of the most important components of British Columbia commercial fisheries over the past century, with catch records dating from 1877. The fishery has evolved from a dry salted product in the early 1900's, to a reduction fishery in the 1930's; to the current roe fishery that began in 1972. In addition to the roe fishery, whole herring and / or herring spawn was harvested in the following fisheries: food, social and ceremonial; roe; spawn on kelp; winter food and bait; commercial, sport, personal use bait; charity sales; zoo and aquarium food; test fishing; and research.

In this report, we briefly summarise stock assessment results and forecasts, and document allocations to all 1999 / 2000 herring fisheries. Management structures of the various herring fisheries are described, and catch information is presented. Sections documenting the dates and locations for roe herring fisheries, winter food and bait fisheries, and test fisheries are also included.

2.0. STOCK ASSESSMENT

Planning for herring fisheries begins in the summer with a review of herring stock assessment information by the Pelagics Subcommittee of the Pacific Scientific Advice Review Committee (PSARC). The Pelagics Subcommittee is made up of herring research staff from the stock assessment division at the Pacific Biological Station, and herring fishery managers from the resource management branch. Seven First Nations representatives and four industry representatives also participated in the stock assessment process, which took place on August 31, September 1, and September 2 of 1999. At this meeting, an assessment of current year herring abundance is made, and abundance for the subsequent year is forecast for the five major stock assessment regions (Figure 1).

Herring stock assessments are made using both the age-structured model (ASM) (Haist et al. 1985), and the escapement model (EM) (Schweigert and Stocker 1988). Both models utilise the available 50-year time series of catch, spawn, weight-at-age, and age-structure information. The estimated spawning escapement in each assessment region is used to forecast abundance for the next fishing season by applying average growth and survival rates to determine the biomass of returning adults. Forecast biomass is calculated as the total of repeat spawners, plus new "recruits" (i.e. first time spawners). An estimate of the average of the third poorest, middle third, and third best of the historically observed recruitment is added to the estimate of returning adults to generate three alternative stock forecasts for the coming year from each assessment model. In general, the average recruitment forecast is adopted for the coming season unless ancillary information is available to indicate that recruitment will be better or poorer than average. Results from both assessment models are reviewed to develop a consensus on which model forecast is most likely in each area.

The five major British Columbia herring stock assessment regions are currently managed by a fixed harvest rate strategy in conjunction with fishing thresholds, or "cut-off" levels for each region. Recommended yields are set at 20 percent of the forecast biomass for each of the major assessment regions, provided that the recommended yield does not reduce the biomass below the Cut-off. The 20 percent harvest rate is considered to represent a conservative level of removals given the biological productivity

of the major herring stocks (Schweigert and Ware, 1995). Cut-off levels are set at 25 percent of the estimated unfished average biomass, as determined by simulation analyses. As the forecast abundance approaches the Cut-off, the recommended yield is the difference between the forecast abundance, and the Cut-off. When the forecast falls below the Cut-off, a decision may be made to close the region to commercial fishing.

2.1. RECOMMENDED YIELD FOR 2000

The forecast biomass for 2000 for the five major stock assessment regions totalled 205,340 tonnes, or 226,349 tons[1] (Schweigert and Fort, 1999). The Pelagic Subcommittee of PSARC reviewed the forecast, and recommended a biological yield of 43,508 tons for 2000 (PSARC, 1999);
(http://www.pac.dfompo.gc.ca/sci/psarc/proceedings.htm).

The model used (EM or AS), recruitment assumption, corresponding 2000 pre-fishery biomass forecast, and the recommended yields for each of the major stock regions are summarised in Table 1.

In the Queen Charlotte Islands, an average recruitment option was adopted for 2000, resulting in a forecast pre-fishery biomass of 16,623 tons, and a potential harvest of 3,329 tons.

An average recruitment option was adopted in the Prince Rupert District, resulting in a forecast pre-fishery biomass of 40,785 tons, and a potential harvest of 8,157 tons.

The average recruitment option was also used in the Central Coast, resulting in a pre-fishery biomass forecast of 51,853 tons. Application of the 20 percent harvest rate resulted in a recommended yield of 10,373 tons.

In the St. of Georgia, the 2000 forecast pre-fishery biomass, assuming average recruitment, was 93,388 tons, which allowed for a potential harvest of 18,673 tons.

In the West Coast of Vancouver Island, the recruiting 1997 year-class was forecast to be poor to average. This resulted in a forecast pre-fishery biomass of 23,700 tons, which was slightly above the Cutoff level of 20,723 tons. Application of the harvest rule to the forecast resulted in a recommended yield of 2,976 tons (i.e. 23,700 – Cutoff = 2,976 tons)

The Subcommittee recommended a yield of 63 tons for Area 27, calculated as 10 percent of the assessed 1999 abundance; there was no surplus for Area 2W.

3.0. MANAGEMENT PLANNING PROCESS

Operational planning for the 2000 herring roe fishery and other herring fisheries began in September with local area meetings held in Port Alberni, Courtenay, Prince Rupert,

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[1] Traditionally, all estimates and forecasts listed in PSARC documents are in metric tonnes. "Short tons" (i.e. 2000 pound tons) are the measurement unit of choice for the Herring Technical Working Group, Herring Industry Advisory board, and Industry in general. For the sake of consistency throughout this document, all weights given will be in tons.

Queen Charlotte City and Bella Bella. At the meetings, current herring stock status information and yield recommendations for 2000 were presented. Attendees were provided the opportunity to comment and advise on any issue pertaining to herring resource management in their local area. Stakeholder comments and advice obtained from these meetings were carried forward to regional advisory sessions, including the Herring Technical Working Group (HTWG) and the Herring Industry Advisory Board (HIAB) meetings, held in late September and early October.

The HTWG is made up of departmental staff augmented by a limited number of First Nations and commercial fishing industry representatives, and a representative from the BC Fisheries Ministry. At the September meeting of the HTWG, the expected herring utilisation for all non-roe herring fisheries was accounted for in an "expected use table" (Table 2). The remaining herring TAC in each of the five stock regions was then allocated to the roe fishery. The resulting roe fishery catch allocations were used in the development of a series of preliminary coastwide harvest options. In developing roe fishery options, consideration was given to advice provided by First Nations and other members of the public in prior advisory sessions. The committee also prepared recommendations for roe fishery management strategies and reviewed plans for the herring test fishery program.

All recommended management options and strategies were carried forward to subsequent meetings of the Herring Industry Advisory Board (HIAB). This committee is made up of participants from twelve organisations representing all sectors of the herring fishing industry. Representatives of coastal First Nations also participated in the 1999 HIAB meetings. HIAB was tasked with developing a recommended coast wide roe fishery option and to advise the Department on specific fishery management issues. There were two HIAB meetings held in 1999. The first meeting in early October was primarily an information session in which stock status information, roe options, and management recommendations from the HTWG were presented. Stakeholder participants were then provided a period of several weeks to consult with their constituents before reconvening in a meeting held in the latter part of October. At the final HIAB meeting, fishing industry and First Nation representatives shared their perspectives regarding a potential roe fishery plan for 2000. Fishing industry representatives then developed a recommended coast wide roe fishery option for 2000 which was an attempt to accommodate both the commercial fishing industry and First Nation perspectives in each stock region.

4.0. ALLOCATIONS

Allocations to all 2000 herring fisheries are recorded in Table 2. Food, social and ceremonial allocations are assigned first; allocations to other commercial fisheries and test fisheries are made next, and roe fishery allocations are assigned after all other allocations are completed. The HTWG allocated 33,599 tons to the 2000 roe fishery. HIAB subsequently approved a roe herring fishing plan of 28,825 tons, after taking into consideration native rights and concerns, and the distribution of the quota. Allotments to other fisheries were as follows: spawn on kelp - 3,475 tons (includes 375 tons from minor areas); commercial communal fishery - 310 tons; winter food and bait fishery (including sport, commercial, and personal use bait, as well as Walcan and Fjord permits) -1649 tons; charity sales - 275 tons; zoo and aquarium food - 110 tons; and Herring Conservation & Research Society (HCRS) for test fishing and research - 2930

tons. Each fishery is conducted so that the sum of catches for each area does not exceed the total allowable catch for that area.

5.0. SUMMARY OF FISHERIES

5.1. FOOD SOCIAL AND CEREMONIAL FISHERY

Food, social, and ceremonial allocations are the first allocations entered in the expected use table (Table 2). In 2000, these allocations totalled 1535 tons, and are broken down by region as follows: Queen Charlotte Islands – 150 tons; Prince Rupert District – 600 tons; Central Coast – 600 tons; St. of Georgia – 35 tons; and West Coast of Vancouver Island – 150 tons. Summaries by area follow.

5.1.1. Queen Charlotte Islands

In the Queen Charlotte Islands, monitoring of the native spawn-on-kelp (k'aaw) fishery was conducted primarily by the Haida Fisheries Program. Fishers were requested to register with Haida Fisheries and were monitored by Aboriginal Guardians as to fishing effort and harvest. Fisheries management personnel and Conservation & Protection personnel also monitored the FN spawn-on-kelp fishery during the 2000 season. Effort in the Haida fishery was less than usual because many traditional harvesters were involved in Skidegate Band license J37. Some individual Haidas involved in J license operations also gathered product for food, social, and ceremonial purposes. No harvest numbers were provided by the Haida Fisheries Program. However, DFO managers estimate the total amount of product harvested for food to be approximately 10,000 pounds, which is twice the amount that is estimated (by DFO) to have been harvested during the 1999 season.

5.1.2. Prince Rupert District

No information available.

5.1.3. Central Coast

No information available.

5.1.4. Strait of Georgia

Some problems were encountered this year due in part to a lack of communication and co-ordination. Some of these problems included: First Nations (FN) fishing without notifying the FN herring co-ordinator or DFO; trouble in obtaining vessels capable of packing the quantity of herring required by the bands; using inappropriate equipment to catch the herring; and fishing in low spawn areas. Poor weather during the first and second week of March also hampering fishing opportunities.

The FN that participated in this fishery included: Nanoose, Nanaimo, T'Sou-ke, Saanich Tribes, Halalt, Chemainus, Lyackson, Penelekut and Sliammon.

FN began fishing in early March in Baynes Sound for whole herring by brailing fish caught by a seine test boat into a punt. This method proved to be time consuming and ineffectual and was abandoned. Attempts to charter a gillnet vessel to catch the fish was considered, but proved too costly. A small herring beach seine was constructed to obtain the herring and was used both in Baynes Sound and below Dodd Narrows. This also proved to be a very time consuming method of obtaining whole herring.

A spawn on boughs fishery took place in the Denman / Hornby Islands area. This fishery was much more successful with First Nations obtaining the quantity of product they required. In this fishery, individual First Nations were responsible for setting the boughs, monitoring and retrieving their own gear and product.

A total of approximately 8.5 tons of whole herring, and 7.5 tons of spawn on boughs was taken from the St. of Georgia for FSC purposes.

5.1.5. West Coast of Vancouver Island

In Area 23, approximately 5000 pounds of whole herring was caught by the test boat and given to FN. Additionally, 8,770 pounds of spawn on boughs and 100 pounds of spawn on kelp were reported to have been harvested. There was also an unsuccessful attempt made at gillnetting herring.

Area 24 information indicates about 750 pounds of herring was given to FN by the test boat; an additional 500 pounds was caught by FN gillnet; and about 200 pounds of spawn on kelp was harvested from Sydney Inlet. It is felt the Area 24 information is incomplete (pers. comm. L. Gordon, fishery manager WCVI).

There is a broad range in the Area 25 estimates of FSC use, depending on the source of the information. Bands received approximately 1,300 pounds of whole herring from the test boat working in the area. Additionally, estimates of spawn on kelp and trimmings that were taken from local operators range from 2,200 to 7,000 pounds.

5.2. ROE FISHERY

The commercial roe herring fisheries traditionally occur in some or all of five geographic areas which correspond to the major stock assessment regions (Figure 1). Within each of these areas, the usual practise has been to schedule different fisheries for gillnets and seines, so the entire quota for any of the five areas is rarely taken from single sites. The location and timing of fisheries within these sites is based on operational considerations, including the suitability of the fish (i.e. size and roe maturity), accessibility to the fleet, and the capacity for enforcement. Fishing generally takes place in late February to early March in southern BC, and mid-March to mid-April in northern BC. Opening dates and times for the commercial fishery are announced on the fishing grounds as the roe matures to optimum quality. Specific fishing locations are determined by major concentrations of fish and the potential for the highest roe yield.

A limited entry personal herring seine (HS) or a herring gillnet (HG) license is required to participate in the roe herring fishery. Currently there are 252 seine licenses and 1257 gillnet licenses. In the past, roe herring fisheries were characterised by high catching power. To practise more risk averse management techniques, the roe herring fishery is currently managed under a pool fishery system. In 2000, license holders were required to pool a minimum of eight seine licenses or four gillnet licenses in order to fish. (There was no maximum number of licenses in a pool.) Each pool fished independently until their quota was caught. If a pool caught more than their quota, the overages were disbursed in the following priority: given to other pools of the same gear type fishing in the same area; used by test boats of the same gear type working in the area (when feasible); and relinquished to the Herring Conservation and Research Society. Overages caught by a pool in one management area could not be transferred to a pool with an underage in another management area. Additionally, overages could not be transferred between gear types. All catches (seine and gillnet) were validated at point of

landing by industry funded, DFO approved validators. In 2000, J.O. Thomas & Associates Ltd. supplied all dockside validators.

The commercial roe herring fishery is traditionally allocated approximately 75-80% of the PSARC recommended allowable catch, and the 2000 roe quota of 28,815 tons was 66% of the PSARC recommendation. (The 2000 quota was slightly less than the 1999 quota of 29,000 tons.) It was split between the seine and gillnet gear sectors: 55% (15,840 tons) was allocated to seines, and 45% (12,975 tons) to gillnets. Total roe herring catch for all areas was 30,011 tons (16,755 tons caught by seine; 13,256 tons caught by gillnet). Seine and gillnet quotas, catches, and number of licenses by license area are recorded in Table 3.

5.2.1. Queen Charlotte Islands

A catch target of 1500 tons was allocated to the QCI seine fishery. (There was no QCI gillnet fishery in 2000.) Two pools were formed from the twenty-one seine licenses (on thirteen vessels) that chose to fish in this area. Each seine license share was 71.4 tons.

The fishery opened for seines in upper Burnaby Strait (subarea 2-13) at 0624 hrs on March 15, and closed for the day at 2000 hrs. Catch locations included Island Bay, Limestone Rock, and Nomad Island. The weather throughout the day was very poor, with heavy rain, and winds up to 45 knots. On March 16th, the fishery was reopened in 2-13 (Skaat Harbour) at 0600 hrs, with additional subareas 2-15 and 2-16 (Skincuttle) opened later in the morning (Figure 2). At 1223 hrs, the area was closed for the balance of the season. Catches on the first day totalled 935 tons, with an additional 705 tons caught on the 16th. All catch for this fishery (i.e. 1640 tons) came from the Burnaby Strait / Skaat Harbour areas.

5.2.2. Prince Rupert District

Seine fishery: A catch target of 1300 tons was allocated to the Prince Rupert area seine roe herring fishery. As in past years the primary catch target area was Kitkatla Inlet (Figure 3). A total of 19 licenses, formed into 2 pools, elected to fish the area.

Fish stocks in the area remained in the shallows most days, making hydroacoustic assessments difficult. A fix winged aircraft was employed more this season than in previous years to locate stocks within the area. Overall assessments were hampered by poor weather conditions throughout the month of March.

On March 19 a body of fish, tested at 12.5%, was located on the east side of Gurd Island. The fleet was called to the grounds, but the fish remained in the shallows. Sporadic spawning commenced on the 20th of March, thereby eliminating that fishing opportunity. The fleet returned to Prince Rupert but was kept on a relatively short notice. Spawning continued in the Kitkatla Creek area until March 25th.

On the morning of March 27th, following storm force winds, a body of fish which tested at 13% and 14.6% was located on the east side of Gurd Inlet. Industry was notified and the fleet was called to the grounds. Roe quality was found to be acceptable to industry and a fishery commenced at 16:00 hrs on the east side of Gurd Island, with 4 vessels designated to set. A total of 12 sets were attempted, but due to fast moving schools and strong tides, only 2 sets were successful. The fishery closed at 20:00 hrs. with a hailed catch of 439 tons.

Following discussions with the pool captains it was decided to reopen the fishery at first light on the morning of March 28th. Four vessels were designated to set at opening and the fishery reopened at 06:15 hrs. The first 4 sets were made within 15 minutes, and all were successful. A further 2 sets were approved which also were successful. A final set was required to complete the catch target. The fishery closed at 15:45 hrs, with a hailed catch of 1330 tons. Final validated weight was 1366 tons.

Gillnet fishery: The 3225 ton Prince Rupert gillnet quota was caught by 260 licenses, which were organised into 12 pools. The fishery started with approximately 70 punts operating: 2 in Cunningham Pass; 1 in Pearl Harbour, 15 near Burnt Cliff Island; 20 between Belletti Pt. and Shattock Pt. and 32 between Shattock Pt and Swallow Island (Figures 4 and 5). First shakes averaged 1 to 2 tons, and the catch rate remained slow but steady throughout the fishery. Poor weather at times restricted fishing. The fleet generally moved southward with the progression of the spawn. Pools began to reach their quota by March 31 and the fleet size declined accordingly. The last of the fishing fleet ended up at Trenham Pt. The fishery ended after 76 hours at 2000 hrs on April 01. Roe quality was consistent with the low being 13% and high of 17 %. The validated catch weight was 3308 tons.

5.2.3. Central Coast

Seine Fishery: Ninety-nine seine licenses chose to participate in the 6,000 ton Central Coast seine fishery. The licenses were fished from 79 vessels, organised into 6 pools. A test set of 9.8% in East Higgins Pass on March 13th triggered a notice to industry that announced there would be no seine fishery prior to the morning of March 15. On March 14th, test sets of 14.7% in Boddie Pass and 14.9% in Berry Inlet confirmed that a seine fishery could be open soon. The fishery was opened on March 17, from 1245 hours to 2000 hours in sub-area 7-13, and portions of 7-12 and 7-8 (Figure 6). Spiller Channel was open south of a line from the point at the north end of Mosquito Bay, east to Yeo Island. The eastern boundary was a line from Early Point to Grief Island on to Hyndman Reef and then to Idol Point. The western boundary was from the mouth of Gale Pass to Fisher Point. Berry Inlet was closed inside boundary signs at the entrance. There were 6 pools fishing, and by the end of the first day one pool had obtained its quota. Approximately 4500 tons were taken on the first day. The fishery reopened at 0700 hours on March 18 in the same areas as the previous day and continued past midnight to 0115 hours on March 19. The top boundary in Spiller Channel was extended at 1615 hours to include all of Spiller Channel, although no catches came from this new area. (Bullock Channel and Spiller Inlet remained closed.) Fishing was slow with about 1000 tons caught. Approximately 500 tons of quota were left to catch, as indicated by hailed catches. Three pools were finished by the end of the day while 3 pools still had a small amount of quota to catch. The fishery re-opened for the third day on March 19th at 0530 hours and closed at 1145 hours.

Total hailed catch for the fishery was 6,027 tons, and the final landed weight was 6,513 tons, which was 512 tons over the quota. Individuals and companies indicated that roe yields throughout the fishery ranged between 13% and 17% with the exception of the last set, made at Bullen Rock, where smaller fish were caught testing out at 11%.

Gillnet Fishery: One hundred and twenty-six (126) gillnet licenses formed 7 pools to catch the 1,000 ton Central Coast gillnet quota. (This worked out to a per-license share

of 7.94 tons.) Spawning started in Powell Anchorage on March 21 but to avoid a conflict between gillnet gear, spawn on kelp operations, and open-pond strings, no gillnet fishery occurred in Powell Anchorage.

The gillnet fishery opened on March 28th at 1045 hours in the portion of subarea 6-16 south of a line from Wilby Point to Lombard Point, all of sub-area 6-17 (Figure 7), and that portion of 7-3 west of a line from Jorkins Point. to Aldrich Point (Figure 6). The fishing effort was in the East Higgins Pass area from the South Lagoon west to just inside the gut in East Higgins Pass. Catches averaged 1 ½ tons per shake for the first 6 hours of fishing. During that time, all 7 pools were fishing using approximately 35 nets. The fishery continued through March 29th and by the end of the day only 3 pools still had not caught their allocation. The spawn had expanded significantly with fishing occurring from the South Lagoon to the Narrows and then along the westerly shore. By the early morning of March 30 the remaining 3 pools had only a small amount of herring to catch. Fishing was slower than the previous day, and the spawn had expanded to include a section of the north shore of East Higgins. All pools obtained their quota in the morning, and the gillnet fishery was closed at 0745 hours. Total validated weight was 1021 tons.

5.2.4. Strait of Georgia

Seine Fishery: The seine quota for the St. of Georgia was 6540 tons. Ninety-two seine licenses chose to fish this area, and were licensed in 6 pools.

On February 24th there was approximately 3 nautical miles (nm) of spawn on the East Coast of Denman Island, between Fillongley Park and Komas Bluff. Spawning continued with varying intensity in Baynes Sound, Lambert Channel, and down to Newcastle Island until February 29th. No spawn was observed on March 1st. Test sets on the 1st ranged from 10.4 to 11.7%, and the seine fleet was advised to be on standby for a 0700 announcement the following morning .

Test sets in lower Baynes Sound on March 2nd indicated roe percentages of 12.2%, 13.8% and 10.6% . Some poor quality fish was identified in Upper Baynes Sound and the fleet was advised to stay below the Denman Island ferry landing. The fishery opened in subarea 14-8 at 0900 hours on March 2nd with 15 vessels permitted to set (Figure 8). One pool choose not to set until near the end of the day. A total of 55 sets were permitted on the first day. Six sets were released due to small fish, with no apparent problems in terms of drying up and releasing the fish. The fishery was closed for the day at 2317 hours with a hailed catch of 6222 tons . Several large sets in the 4-500 ton range were lost.

The area was reopened for seines at 0805 March 3rd, with the focus directed on the one pool that chose to fish conservatively the day before. A set was made at Chrome Island but was rejected as small fish. A total of 15 sets were made on the 3rd, only three of which caught any fish. Total catch for the day was 312 tons. As vessels were validated it was determined that 3 pools were actually over quota by approximately 160 tons. In the morning of the 3rd, there was a total of 3.5 nm of active spawning, mainly along the Repulse Point to Boyle Point shoreline and along the Vancouver Island shoreline near Thames Creek. The spawning continued to expand in the afternoon.

During the morning of the 4th, the seine test vessels were cleared to scout and look for good quality fish to complete the seine pool fishery and possibly take some extra charter fish. A set made by a test boat in Lambert Channel caught 155 tons at 13% that was

given to the Independent pool. This set finished the seine pool fishery although two companies had to obtain the remainder of the catch from overages in Vancouver. Final validated weights indicated 6689 tons were caught.

Gillnet Fishery: Seven hundred and ninety-two (792) gillnet licences, organised into 23 pools, chose to fish in the 8000 ton St. of Georgia gillnet fishery.

On the morning of March 4th, aircraft assessment indicated a total of 6.5 nm of active spawning mainly along the Mapleguard Point to Nile Creek shoreline with some spawning continuing along the Repulse Point shoreline. There were very good showings of fish in the shallows along the Thames Creek shoreline. The gillnet fishery opened at 10:00 hours Mar 4th . All of Area 14 was open, with the exception of Comox Harbour, (sub-area 14-14) (Figure 8). A gear count in the early afternoon showed a total of 166 skiffs fishing (122 fishing along the Vancouver Island shoreline near Thames Creek and 44 operating at the bottom of Denman Island between Repulse Point and Eagle Rock). The fishing rate was generally good with mostly medium shakes throughout the day. Initial roe tests conducted at the beginning of the fishery ranged from 12.5 to 14.5%. Weather conditions were excellent with light NW winds easing in the afternoon.

By the morning of March 5th, the gear count had dropped to 127 gillnet skiffs fishing (49 from the bottom of Metcalfe Bay to Chrome Island, 26 from Chrome Island to Gravelley Bay and 52 from Mapleguard Point down to the Big Qualicum River). Later in the day 5 skiffs moved into Tribune Bay. Fishing rates continued to be fair with mostly medium shakes. Spawn areas continued to spread along the Vancouver Island shoreline down to the Big Qualicum River and continued on the bottom of Denman Island from the bottom of Metcalfe Bay around to Gravelly Bay. Spawning also started along the east side of Tribune Bay and at Columbia Beach. Active spawning totalled 12 nm. The estimated catch to noon on March 5th was 5200 tons.

Most pools were finished fishing by March 6th, and only 33 skiffs were left fishing (21 operating below Nile Creek towards the Little Qualicum River, 3 in Tribune Bay and 9 at the bottom of Denman Island) Spawning continued to expand dramatically, and totalled 26 miles on this day. By the evening only 2 pools fishing a total of 5 skiffs were left on the grounds.

Although two pools were fishing, (with 3 skiffs at French Creek and 1 skiff near Chrome Island), the overall catch target for the gillnet fishery had been reached on the morning of March 7th. The fishery closed at 08:30 hrs on Mar 7th, with a validated catch of 8,155 tons. At the closure of the fishery there was still 23 nm of active spawning in Area 14.

5.2.5. West Coast of Vancouver Island

Seine Fishery: Prior to the fishery herring were found mainly between Chrow and Forbes Islands. Test sets were consistent in size with some indication of smaller fish around. Science Branch predicted that the peak roe yield should be about 12.7% and the last in-season prediction was that this should occur around March 12. By March 8, roe yields were at 12% and there were very few condition 2 and 3 roe. The fishery opened at 0930 hours on March 8 in subareas 23-11 and portions of 23-9 and 23–10 (Figure 9). Two pairs of vessels were designated to scout, and one vessel from each pair was cleared to set after receiving clearance from DFO. Initial sets were made and evaluated with additional sets allowed when it was clear that the target was not close to

being attained. Fish were hard to catch and several waterhauls were made. One set was released because the fish appeared to be small. All sets were tested by industry before being dried up and pumped. The fishery began by Forbes Island and slowly moved out towards Chrow Island as the day progressed. The fishery was closed for the day at 1830 hrs. There was a general belief that the fish size in the catch would decrease when the herring started to skim out.

With a confirmation of the hails at 350 tons, additional sets were allowed starting at 0700 on the following day, March 9th. Fishing again began around Forbes Island. Two sets caught fish -one set was released due to fish size - and the fishery was closed at 1400 hours.

Weather was good during the fishery with no wind and only a low swell. Roe tests by industry during the fishery showed a consistent 12% or better. As fish were sampled at the plants, it was discovered that a couple of sets yielded 10% or less roe due to a high proportion of males. One vessel was issued a written warning for failing to hail to J.O. Thomas before landing fish.

Gillnet Fishery: Roe maturity in Esperanza Inlet reached 10% on March 1st, but there was no significant spawning activity until March 21st. Fish remained in a consistent holding pattern, and were located outside the entrance to Rosa Harbour, and near Double Island. In the afternoon of March 21, one-half nm of spawn occurred along the Nootka Island shoreline between the entrance to Rosa Harbour and Garden Point. Sub-area 25-13, (Esperanza Inlet seaward of Steamer Point) was opened at 1600 hours on March 21 (Figure 10). Seventy-two licenses were authorised to catch the 750 ton quota. All 10 pools were on the grounds and actively fishing by 1930 hours. At 2130 hours there was a total of 27 nets fishing, and spawning had spread to cover an area approximately 2 nm in length. Weather conditions were variable but the area was very well protected from ground swell and offshore winds, so packers were able to anchor in the vicinity of the fishing grounds. The catch rate was fairly consistent throughout the fishery although it did drop off somewhat during the evening of March 21. The catch rate picked up on the morning of March 22 and there was medium to heavy shaking until closing on March 24.

All but one of the pools caught their quotas by 1200 hours March 23rd. The last pool took an additional 12 hours to reach their catch target because of a lack of gear and crew. Seven hundred and seventy-two tons were landed in this fishery.

5.3. SPAWN ON KELP FISHERY

The commercial spawn on kelp fishery occurs in 4 of 5 geographic areas which correspond to the major stock assessment regions (Figure 1): Queen Charlotte Islands (Area 2E); Prince Rupert (Areas 3,4,5); Central Coast (Areas 6,7,8); and West Coast of Vancouver Island (Areas 23, 24, 25). In addition, some licences operate in locations supporting minor herring stocks, including Quatsino Sound (Area 27), Johnstone Strait (Area 12),and Smiths Inlet (Area 10). The fishery is carried out in specific locations in which there are adequate herring spawns, and which lend themselves to herring ponding operations.

Spawn on kelp fisheries generally take place in March and April, with fisheries progressing in-season from south to north. In some years, fishing will persist into May and June in more northerly locations.

In recent years, herring allocations to the spawn on kelp fishery have amounted to approximately 5% of the total TAC. Landings have increased in the last decade with an increase in the number of licences operating and as a result of increased operator efficiency.

Forty-six category "J" licenses (which are non-transferable) were issued to harvest herring spawn on kelp in 2000. The majority of licence holders in the fishery are First Nations individuals or tribal groups (37 of 46 licences). Individual quotas are specified on each licence. In 2000, individual quotas were eight tons of drained product, subject to the quota carry over provisions. An exception to the eight ton catch allocation exists for those Native band licences, which have not met roe herring licence retirement provisions. (The IQ for the 11 Native band licences issued in 1991 and 1992 are proportionate to the number of roe herring gillnet licences retired or rendered inactive for 2000.)

A quota carry-over program introduced in 1996 was continued in 2000. This program allows spawn on kelp licence holders to carry over reasonable IQ overages or underages, from one year to the next. The rules for carry over are as follows:

- Licence holders whose product weight at the end of the season is under the IQ by 2000 lbs. or less will have the equivalent weight of the underage added to their IQ in year 2001.
- Licence holders whose product weight at the end of the season is under the IQ by more than 2000 lbs. will have only 2000 lbs. added to their year 2001 IQ and will forego the remainder.
- Licence holders whose product weight at the end of the season is over the IQ by as much as 1000 lbs. may retain the overage, and the equivalent weight of the overage will be subtracted from the licence holder's year 2001 IQ.
- Licence holders whose product weight at the end of the season is over the IQ by more than 1000 lbs. may retain 1000 lbs. of the overage, and must relinquish the remainder. Further, the weight of the total overage will be subtracted from the licence holder's IQ in year 2001.

The weight of the spawn on kelp product to be applied against an IQ will be the total drained weight of spawn on kelp product validated at the landing port. A salt allowance, equal to 5% of the total drained weight, is applied to compensate for salt and entrained water (i.e., the total validated weight will equal the drained weight minus 5% of the drained weight).

The transfer of spawn on kelp product between licence holders operating in different stock assessment regions is not allowed. Spawn on kelp product can be transferred on-grounds between licence holders in the same stock assessment region. In-plant transfers of product between licence holders from the same stock assessment area can be carried out subject to the prior approval of a Fisheries and Oceans representative.

The industry-funded monitoring and validation program introduced in 1996 continued for the fifth consecutive year in 2000. The objectives of this program include both the

monitoring of on-grounds fishing activity and the port validation of product. On-grounds monitoring maintains a record of fishing activities and operations. Port monitoring validates the landed harvest documented by on-grounds records, validates drained weight measurements and in-plant transfers of both processed and unprocessed product between licence holders, and audits the utilisation of J-licence pails and pail decals during processing. There were a total of 10 on-grounds monitoring assignments: 1 assignment in the Queen Charlotte Islands to cover 10 J license operations; 2 assignments in Prince Rupert for 11 operations in areas 3, 4, and 5; 4 assignments in the Central Coast for a total of 18 J license operations in areas 7, 8, 10 and 12; and 3 assignments on the West Coast of Vancouver Island to cover 7 operations in areas 24, 25, and 27. Additionally, 9 port monitors were employed to validate offloads at all plants.

Three thousand four hundred and seventy-five (3,475) tons of herring were allocated to 2000 spawn on kelp fisheries, and an additional 310 tons were allocated to commercial communal spawn on kelp fisheries. The coast wide quota for spawn on kelp product was 360.4 tons, based on 8 ton individual license quotas adjusted for carry-overs from 1999. Table 4 contains information about 2000 spawn on kelp landings by area and location. Forty-six licenses operating in 11 statistical areas landed a total of 716,353 pounds of product, harvested from a combination of open and closed ponding operations. (Seventy-one percent of the total harvest came from closed ponds, and 29% came from open ponds.)

5.4. WINTER FOOD AND BAIT FISHERY

The winter food and bait fishery is intended to provide a small quantity of herring to firms wanting to engage in secondary processing of food herring products, and to satisfy frozen bait requirements of commercial fishers.

Vessels are selected to participate in this fishery through a lottery system. Interested vessel owners submit an application to fish in an area. (A vessel may only be entered on one application, and must have been licensed in 1999 in one of the "A" seine, "T" trawl, or "H" license categories.) Vessels that were selected in the lottery system were issued a 1999 non-transferable 50 ton "ZM" category license, after producing documentation showing that the vessel had an approved stability certificate for catching or packing herring as required under the Canada Shipping Act. Vessels participating in this fishery must have a full sized herring seine net, or trawl net with a herring liner. All herring caught under this vessel quota system must, as a condition of the license, be delivered to a British Columbia port for catch weigh-in. Additionally, vessels were required to have an approved observer on board at all times while carrying out fishing and off loading operations.

The 1999 allocation for the Food and Bait Herring lottery fishery was 850 tons, broken down into 550 tons for the St. of Georgia, and 300 tons for Johnstone St.

5.4.1. Strait of Georgia

The Strait of Georgia 550 ton allocation reflected the market demand for mainly food herring (pickled herring). Eleven vessels were selected to fish in the Strait of Georgia food fishery. During this year's fishery, the majority of catch (545 tons) came from Area 17, mainly from outside Nanoose Bay near Maude Island. An additional 87 tons was caught in Area 14, at French Creek and Qualicum. Herring migration into the Strait of Georgia during the fall/winter period appeared later than normal this year which caused

some problems in processing requirements for marketing. The majority of the catch was not harvested until December, with the balance caught in mid-January. Good showings of stocks were located outside Nanoose Bay and in lower Lambert Channel near Norris Rock.

5.4.2. Johnstone Strait

Six vessels were picked to catch the Johnstone Strait allocation of 300 tons, which is mainly utilised for frozen sport bait. No fishable stocks were located in the Deepwater Bay area during the fishery period. This could be due to a change in migration pattern this year which was also observed in the Strait of Georgia. Therefore, licences were amended to allow fishing in Area 14. All of the Johnstone Strait lottery catch was taken from Area 14 near Norris Rocks in early February. (Licenses were amended to allow fishing until Feb 9, 2000.) Due to the high quality requirements for processing and marketing, these fish were live transported by vessel to holding pens in Johnstone Strait. The total catch of 127 tons was 173 tons short of the Johnstone Strait target of 300 tons. This shortfall was primarily due to the delay in starting fishing and also the need to live transport herring.

Catch by fishery and area is detailed in Table 5.

5.5. SPECIAL USE FISHERY

The purpose of the special use herring fishery is to provide opportunities to catch herring for a variety of uses: personal fishing bait, food, sport fishing bait impoundments, commercial bait, zoo and aquarium food and charity fisheries. These opportunities are not available during other herring fisheries such as the roe herring fishery, spawn-on-kelp fishery, or the food and bait herring lottery fishery.

In order to participate in this fishery, the applicant must obtain a 2000 "ZX" or "ZY" category licence, and the herring must be harvested by a commercially licensed vessel. If the herring caught are for personal use commercial fishing bait a one ton ZX category licence is required. A three ton ZY category licence is required if the herring caught are intended to be sold. License holders can be re-issued another license in the same license year, provided that the license holder can demonstrate that the current license allocation of herring has been utilised. License holders are required to provide a completed landing report prior to re-issuance of a license.

In recent years approximately 1,000 to 1,200 tons of herring has been allocated to the special use herring fishery. (This is in addition to herring allocated to the food and bait herring fall lottery fishery.) In 1999, a coastwide total of 1184 tons was allocated for special use fisheries (Table 2). This allocation was broken down as follows: 20 tons to bait sales for commercial fishermen; 479 tons for sport bait sales (includes 300 ton Walcan permit); 200 tons for domestic food sales (i.e. Fjord ZY permit); 100 tons for personal use commercial bait; 275 tons for charity sales; and 110 tons for zoos and aquariums. Sixty-four ZX licenses and thirty-one ZY licenses were granted. Landing reports were received from 44 ZX license holders, and 27 ZY license holders. Catch totals (tons) by license type and statistical area, as tallied from landing reports received[2], is summarised by statistical area in Table 5.

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[2] ZX and ZY catch totals are preliminary.

5.6. HERRING CONSERVATION AND RESEARCH SOCIETY

At the 1995 fall HIAB meeting, Department of Fisheries and Oceans (DFO) and industry representatives discussed and agreed to the formation of a non-profit organisation, the Herring Conservation & Research Society of BC (HCRS). The role of the Society is to support research that addresses the need for knowledge and understanding of herring biology and the factors that affect fluctuations in abundance. The goal of the HCRS is to assist DFO in developing the tools necessary for ensuring precautionary and risk averse management of the herring resource.

In the fall of 1996, the HCRS entered into partnering arrangements with DFO related to fisheries management. A joint project agreement was signed, wherein the HCRS assumed responsibility for the test fishing program. The Society was given an allocation of fish to use to conduct the test fishing program. This allocation was determined by HIAB, in conjunction with DFO, and was included in the 1996/97 total allowable catch.

A portion of the TAC has been allocated to the HCRS in each subsequent year, and the HCRS carried out test fishing activities for the fourth year in 2000[3]. HIAB approved an allocation of 2930 tons for the HCRS in 2000. (This amount included funding for the test fishing program, as well as 200 tons to fund research programs.) All seine and gillnet fisheries were pooled in 2000. In an effort to reduce overages, the roe fishery management plan stipulated that any overages caught by a pool would be shared in the following order of priority: i) given to another pool in the area; ii) used as test payment; and iii) relinquished to the HCRS. Nine hundred and twenty eight (928) tons of test and roe overage remained after all pools had caught their quotas and all test vessels had completed their catch allocations. This overage was relinquished to the HCRS, who then sold the fish to companies that had licenses participating in the roe herring fisheries in each area. The fish was distributed on a "share basis" (i.e. one license fishing in an area was entitled to purchase one share of overage). Fifteen companies purchased overages and made initial payments totalling $681,494.75, based on a down payment price of $1200.00 per ton for gillnet fish, and $550.00 per ton for seine fish. (Final payments will be made later in the season, when price settlements are complete.)

In 2000, the HCRS approved and funded the following research and management projects totalling $666,000.00:

- upgrade of biosampling database
- continue evaluation of video survey of deep spawn in Barkley Sound
- microsatellite DNA analysis
- coded wire tagging study
- herring metapopulation analysis
- Barkley Sound juvenile herring survey
- area based analysis
- age-at-maturity study for West Coast of Vancouver Island herring
- juvenile herring surveys in St. of Georgia
- funding for spawn overflights in 2001
- funding to the Department for salaries for 1.5 management technicians

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[3] See Section 5.7 Test Fishing Program

5.7. TEST FISHERY

5.7.1. History Of The Test Fishing Program

The test fishing program for the roe herring fishery began in 1975. Seine vessels were chartered only for the period preceding fishery openings, after which time they participated in the commercial fishery. Vessels were not available for the entire fishing season, because they were paid for with money, and the cost of buying a vessel out of the fishery for a season was prohibitive. However, this meant that the test vessel was not available at the critical times when the fishery manager needed test fishing information the most. In additional to monitoring fish quality, the objectives for the early test fishing programs were to estimate herring stock strength on the grounds (using sonar and sounder techniques) in order to adjust catch limits prior to fishery openings (Webb, L., R.O. Boyd, and B.J. Lockner).

As the fishery gained in value and importance, it became apparent that test vessels were needed to assist in management throughout the season, not just prior to the openings. In 1980 test fishing vessels began to be paid for their work with a quantity of herring (i.e. they were paid out of the herring resource), because it was no longer viable to pay for their work with DFO funds. As part of the arrangement, the test fishing vessel would not participate in the roe herring fishery during the year of the test fishery.

In 1983, fixed pre-season quotas and 20% harvest rates were introduced. This changed test fishing duties to a certain degree, as assessing stock strength on the grounds prior to the fishery was not as important when quotas were set pre-season. However, relative abundance in different locations still had to be monitored, as did the size and maturity of fish.

Duties expanded in 1987, when the test fishing program took on the additional task of supplying some platform vessels for the DFO Fishery Officer dive spawn survey. This responsibility quickly evolved to include providing some divers to participate in the survey in 1990; by 1994, all spawn survey vessels and all divers were supplied through the program. Gillnet test vessels, hired in 1991 for gillnet test fishing duties only, also assumed dive survey duties the following season. The first management platform vessel was hired in 1997, and by 2000, 3 management platforms and 2 charter patrol vessels were part of the test fishing program. In addition to data collection for stock assessment, and assessment of fish quality and maturity for industry, the test fishing vessels have increasingly assumed a monitoring function for DFO. As DFO has fewer resources such as patrol vessels and fishery officers to draw on, test boats have increasingly become the "eyes and ears on the grounds" for managers.

5.7.2. 2000 Test Fishing Program

A regional herring test fishing plan is developed for each season. The plan takes into consideration stock assessment requirements (i.e. are there enough vessels to conduct spawn surveys and to adequately sample fish stocks); management needs; and industry demands for timely size and roe maturity information. In most cases, a test fishing vessel is required to retire a license for the season (either seine or gillnet, depending on the charter) in order to participate in the test fishing program.

The 2000 test fishing plan was approved by the HIAB at the October 19, 1999 meeting. The HCRS received an allocation of 2930 tons, (which included 200 tons to fund research projects[4]), to administer the test fishing program. This was part of the total allowable catch (TAC).

In 2000, there were 23 vessels in the test fishing program. A summary of vessels by "category", areas worked, and license type required is found in Table 6.

In the Queen Charlotte Islands, the *Queens Reach* was the seine test vessel working in Area 2E, and the *Southern Provider,* on the second half of a split charter, assessed stocks in 2W. The dive survey was conducted by the *Western Hunter.* Test fish was caught in Skaat Harbour, in conjunction with the pool fishery. The test fish requirement for QCI was 291 tons.

Seine test fishing in Prince Rupert District was done by one full charter (*Nita Maria*), working primarily in Areas 3 / 4, and a half charter *Pachena No. 1*, who worked in Area 5. Gillnet test fishing as well as dive survey duties were contracted to the *Royal Pride.* Three hundred and two (302) tons of test fish were required to pay for Prince Rupert test boats.

Five vessels worked in the Central Coast region in 2000: *Ocean Explorer* was the gillnet test and dive survey vessel; *Christav* had seine test and dive survey duties; *Kynoc* was the full seine charter; *Lasqueti Star* acted as the management platform; and *Tara Lynn* was the split charter with the St. of Georgia. The Central Coast test fish requirement was 584 tons.

A total of 10 vessels participated in the St. of Georgia / Johnstone Strait test fishing program, covering a range of duties: two gillnet test vessels (*Endurance* and *Native Joye*) also conducted all dive surveys in this area; seine test fishing was done by two full charters (*Angela Lynn*; *Ocean Venture*), and two half charters, which were split with Central Coast and Prince Rupert District (*Tara Lynn, Pachena No. 1*); *Snowdrift* was the management platform; and the *Lahaina Joye* was hired to assist in the coded wire tagging program. Additionally, the *Port Lincoln* monitored and recorded spawns in Area 12, as did the *Discovery Huntress* in Area 13. Both Johnstone St. spawn survey vessels were paid in dollars. The test requirement for the remainder of the St. of Georgia vessels was 647 tons.

The West Coast of Vancouver Island was covered by four seine test vessels: *Ocean Horizon* was a full charter working in Areas 23 and 24; *Southern Provider* was split with Area 2W, and worked in Area 27; two additional vessels (*Canadian Shore, Royal Viking*) had dive survey as well as seine test duties. The *Ganges* acted as the management platform for the gillnet fishery in Esperanza, and was paid directly from HCRS funds. Five hundred and twenty-nine (529) tons were required to pay for the other WCVI test fishing vessels.

Test vessels are listed by area of operation in Table 7. Additionally, this table includes dates of operation, bid rates, duration and final requirement of each charter. Table 8 records test fishing catch by location and section, as well as total test fishing catch

[4] See Section 5.6 (Herring Conservation & Research Society) for additional information

requirement for each stock assessment region. Table 9 summarises number of test sets made and the number of samples collected in each statistical area.

ACKNOWLEDGEMENTS

Portions of the information included in the Summary of Fisheries section was obtained from managers' reports presented at the HIAB meeting in April of 2000. Table 4 (the spawn on kelp table) was adapted from a table put together by J.O. Thomas and Associates on behalf of the Spawn on Kelp Operators Association (SOKOA). Editorial comments were provided by Jake Schweigert, Peter Midgley, and Angela McDiarmid

REFERENCES

Department of Fisheries and Oceans web site. Management Areas Pacific Region: http://www.pac.dfo-mpo.gc.ca/ops/fm/Areas/areamap.htm

Haist, V., M. Stocker, and J.F. Schweigert. 1985. Stock assessments for British Columbia herring in 1984 and forecasts of the potential catch in 1985. Can. Tech. Rep. Fish. Aquat. Sci. 1365: 53 p.

Schweigert, J., and C. Fort. 1999. Stock assessment for British Columbia herring in 1999 and forecasts of the potential catch in 2000. Canadian Stock Assessment Secretariat Research Document 99/178: 96p.

Schweigert, J.F., and M. Stocker. 1988. A new method for estimating Pacific herring stock size from spawn survey data and its management implications. N. Amer. J. Fish. Mgmt. 8: 63-74.

Schweigert, J., and D. Ware. 1995. Review of the biological basis for BC herring stock harvest rates and conservation levels. PSARC Working Paper H95: 2.

Stocker, M., and D. Radford (Editors). 1999. Report of the PSARC Pelagic Subcommittee Meeting August 31 – September 2, 1999. Canadian Stock Assessment Proceedings Series 99 / 28: 49 p.

Webb, L.A., R.O. Boyd, and B.J. Lockner. The 1975 herring roe pre-fishery charter vessel monitoring and sampling program. Field Services Directorate, (Pacific Region), Data Record Series No. PAC/D-77-3: 29 p.

Table 1. 2000 forecast biomass and recommended yield (tons) by region.

Region	Cutoff Biomass (tons)	Model Used *	Recruitment Assumption	Forecast Biomass (tons)	Recommended Yield (tons)
Queen Charlotte Islands	11795	EM	Average	16623	3329
Prince Rupert District	13338	EM	Average	40785	8157
Central Coast	19401	EM	Average	51853	10373
Strait Of Georgia	23369	EM	Average	93388	18673
West Coast Vancouver Island	20723	ASM	Poor-Average	23700	2976
Total				**226349**	**43508**

* EM = Escapement Model
ASM =Age Structure Model

Table 2. Herring Working Group 1999/2000 expected use allocations (tons) by fishery and region.

Region	Stock Assessment Committee Recommended Catch (a)	Herring Management Working Group Allocations											
		FSC (b)	Roe Herring	Sok (f)	Comm Com	Winter Food & Bait	Bait Impoundment		Personal Use Bait	Charity	Zoo & Aquar	HCRS (g)	Total Non Roe
							Comm.	Sport					
Queen Charlotte Islands	3329	150	1864	900		0	10	0	5	0	0	400	1465
Prince Rupert District	8157	600	6057	1100		0	10	10	50	0	0	330	2100
Central Coast	10373	600	7983	(170) 700	310	0	0	10	20	0	0	750	(170) 2390
Strait Of Georgia	18673	35	15978	(100) 0		(c) 1050	0	(d) 450	25	275	110	750	(100) 2695
West Coast Vancouver Island	2976	(e) 150	1717	(105) 400		0	0	9	0	0	0	700	(105) 1259
TOTAL	43508	1535	33599	(375) 3100	310	1050	20	479	100	275	110	2930	(375) 9909

a) Based on forecast abundance of major migratory stocks (Minor stocks are shown in brackets).
b) Food, Social, Ceremonial: communal licences for food social ceremonial purposes will not limit access. DFO will work with the First Nations on a co-operative catch monitoring program.
c) includes 200 ton allocation to Fjord
d) includes 300 ton allocation to Walcan
e) includes 100 T for closed pond
f) no allocation for FJ40
g) includes 200 T allocation for research

Table 3. 2000 Roe quotas and validated landed catch (tons) by gear type and region.

		SEINE				GILLNET			
Region	Statistical Areas	Quota	# of Licences	# of Pools (sn)	Catch	Quota	# of Licences	# of Pools (gn)	Catch
Queen Charlotte Islands	2E	1500	21	2	1640	No gillnet fishery			
Prince Rupert	3-5	1300	19	2	1366	3225	260	12	3308
Central Coast	6-8	6000	99	6	6512	1000	126	7	1021
Strait of Georgia	14-18	6540	92	6	6689	8000	792	23	8155
West Coast Vancouver Island	23-25	500	9	1	547	750	72	10	772
TOTAL		15840	240 *		16754	12975	1250 *		13256

- Number of seine licenses does not include 12 licenses retired for test fishing;
- Number of gillnet licenses does not include 7 licenses retired for test fishing

Table 4. 2000 SOK Licences and landed product weight (lbs.) by statistical area and location.

Location Information				Harvest Information		
Statistical Area	# of Licences	Management Unit	Location	Closed (lbs.)	Open (lbs.)	Total (lbs.)
2E		2-6	Selwyn Inlet	64,096	1400	65,496
2E		2-13	Nomad Island	4,757	0	4,757
2E		2-15	Jedway Bay	82,828	10006	92,834
2	10			151,681	11406	163,087
3/4	8	3-5, 4-6, 4-9	Stuman Bay Pearl Harbour Tugwell Island	108,252	0	108,252
5	3	5-8	Gurd Island	45,290	11,723	57,013
7		7-3	Higgins Pass	19,014	0	19,014
7		7-8	Powell Anchorage	44,759	65,753	110,512
7		7-21	Little Thompson	32264	0	32,264
7		7-27	Spider/Kildidt	0	30,465	30,465
7	12			96,037	96,218	192,255
8	2	8-16	Illahie Inlet	29,147	0	29,147
10/12	4	10-12, 12-16	Takush Daphne Point	24,073	37115	61,188
24	2	24-2	Openit Peninsula	24,737	0	24,737
25	2	25-13	Rosa Harbour	31,582	0	31,582
27	3	27-3	Winter Harbour	0	49,092	49,092
Total	46			510,799	205,554	716,353

Table 5. Catch (tons) for food and bait, ZX and ZY, and charity and aquarium use by statistical area

	Area 4	Area 12	Area 13	Area 14-4	Area 14-5	Area 16	Area 17-18	Area 18-9	Area 19	Area 29	Total Catch	Allocated
St. of Georgia food & bait lottery				87.51			544.77				632.28	550
Johnstone St. food & bait lottery					127						127.00	300
Fjord ZY license				73.66			177.69				251.35	200
Walcan ZY license		129	151				20.00				300.00	300
Charity				86							86.00	275
Aquarium							72.00	41.1			113.10	110
ZX Personal Use Bait	0.99	9.94	2.02			0.01		0.11	0.20		13.27	100
ZY Other Use Bait		1.88	10.13			9.23				0.15	21.39	199
TOTALS	**0.99**	**140.82**	**163.15**	**247.47**	**127**	**9.24**	**814.46**	**41.21**	**0.20**	**0.15**	**1544.39**	**2034**

Table 6. 2000 Test fishing vessels by category.

# of Vessels	Category	Vessel Names	Region Worked	License Required	Payment Type
3	Management Platform	Snowdrift	Gulf	GN	Seine Fish
		Lasqueti Star	Central	GN	Seine Fish
		Ganges	WCVI	None	Cash
1	Dive Spawn Survey*	Western Hunter	QCI	GN	Seine Fish
4	GN Test / Dive Spawn Survey*	Royal Pride	Rupert	GN	Gillnet Fish
		Ocean Explorer	Central	GN	Gillnet Fish
		Endurance	Gulf	GN	Gillnet Fish
		Native Joye	Gulf	GN	Gillnet Fish
2	Surface Spawn Survey	Port Lincoln	Area 12	None	Cash
		Discovery Huntress	Area 13	None	Cash
3	Seine Test/ Dive Spawn Survey*	Christav	Central	SN	Seine Fish
		Canadian Shore	WCVI	SN	Seine Fish
		Royal Viking	WCVI	SN	Seine Fish
9	Seine Test	Queens Reach	QCI	SN	Seine Fish
		Southern Provider	WCVI / QCI	SN	Seine Fish
		Nita Maria	Rupert	SN	Seine Fish
		Pachena No. 1	Rupert /Gulf	SN	Seine Fish
		Kynoc	Central	SN	Seine Fish
		Tara Lynn	Gulf/Central	SN	Seine Fish
		Angela Lynn	Gulf	SN	Seine Fish
		Ocean Horizon	WCVI	SN	Seine Fish
		Ocean Venture	Gulf	SN	Seine Fish
1	Tagging Platform	Lahaina Joye	Gulf	None	Seine Fish

* All dive spawn survey vessels supplied 4 WCB approved "occupational scuba" certified divers.

Table 7. 2000 Test fishing vessels, dates of operations, and payment requirements (tons).

Area	Vessel	Captain	Dates	Duration	Rate	Payment Location	Total
QCI	Queens Reach	J. Legate	Mar 02 - Mar 31	30	4.02	QCI	120.60
2W / 27	Southern Provider	R. Casey	Feb 26 - Mar 09 Mar 13 - Mar 31	32	4.55 w obs 4.25 no obs	WCVI & QCI	140.20
QCI	Western Hunter*	M. Burton	Mar 15 - Apr 25	30	3.2	QCI	96.00
	** dive survey only*						
PRD	Nita Maria	F. Newman	Mar 09 - Apr 03	26	4.49	PRD	116.74
PRD / Gulf	Pachena No 1	M. Ponak	Feb 24 - Mar 08 Mar 18 - Apr 04	32	4.79	PRD & Gulf	153.28
	** Rupert start date ranges from Mar 18 to 22*						
PRD	Royal Pride	D. Malcolm	Mar 17 to Apr 22	37	2.7 gn 2.8 sn	PRD	99.90
CC	Kynoc	B. Wilson	Mar 02 - Mar 31	30	4.4	CC	132.00
CC	Christav^	G. Stava	Mar 09 - Apr 12	35	4.45	CC	155.75
CC / Gulf	Tara Lynn	C. Lewis	Feb 24 - Mar 05 Mar 06 - Mar 24	30	4.1	CC	123.00
CC	Lasqueti Star	A.R.Bunten	Mar 09 - Mar 31	23	2.98	CC	68.54
CC	Ocean Explorer	P. Mydske	Mar 15 - Apr 13	30	3.07 gn 4.00 sn	CC	104.80

Table 7. Continued

Area	Vessel	Captain	Dates	Duration	Rate	Payment Location	Total
Area 12	Port Lincoln	G. Neidrauer	Start Mar 01	30	$450		$13,500
Area 13	Discovery Huntress	Chris Bunn	Start Mar 01	30	$495		$14,850
Gulf	Angela Lynn	A. Tobin	Feb 22 - Mar 18	26	4.23	Gulf	109.98
Gulf	Ocean Venture	G. Budden	Feb 26 - Mar 22	26	5.34 w obs 4.94 no obs	Gulf	107.94
Gulf	Lahaina Joye	A. Sewid	Feb 27 - Mar 02	26	1.89	Gulf	49.14
Gulf	Snowdrift	R. Pierce	Feb 24 - Mar 15	21	3.1	Gulf	65.10
Gulf	Native Joye	M.Fredheim	Feb 26 - Mar 31	35	2.81 gn 4.66 sn	Gulf	98.35
Gulf	Endurance	E. Hegglund	Feb 26 - Apr 03	38	3.10 gn 4.20 sn	Gulf	117.80
WCVI	Ocean Horizon	J. Reid	Feb 21 - Mar 17	26	4.61	WCVI	119.86
WCVI-S	Canadian Shore^	P.Dupuis	Feb 24 - Apr 03	40	3.99	WCVI	165.98
WCVI-N	Royal Viking^	R. Holkestad	Feb 24 - Apr 03	40	4.27	WCVI	177.63
WCVI	Ganges	K. Widsten	Feb 29 - Mar 23	24	$1,150		$27,600

^ Combination Seine Test / Dive Spawn Assessment vessel

QCI = Queen Charlotte Islands; PRD = Prince Rupert District; CC = Central Coast; Gulf = Strait of Georgia; WCVI = West Coast Vancouver Island

Table 8. 2000 test fish payment requirements by region, and catch (tons) by location.

Region	Stat. Area	Herring Section	Location	Gear	Catch (tons)	Requirement (tons)
Queen Charlotte Islands	2E	21	Skaat Harbour	seine	304.623	290.95
Prince Rupert District	4	42	Big Bay	gillnet	82.449	302.86
Central Coast	7	72	Berry Inlet	seine	535.15	
	7	77	E. Higgins Pass	gillnet	50.118	
			CENTRAL COAST TOTAL		585.268	584.09
Strait of Georgia	14	142	Lower Baynes Sound	seine	425.538	
	14	142	Lower Baynes Sound and	gillnet	215.187	
	14	142	East coast Denman Island			
			STRAIT OF GEORGIA TOTAL		640.725	647.07
West Coast Vancouver Island	24	243	Starling Pt. (82 tons), Sydney Inlet	seine	290.07	
	25	253	Rosa Harbour	seine	183.925	
			WEST COAST VANCOUVER ISLAND TOTAL		473.995	529.33
			TOTALS		2087.06	2354.3

Table 9. Summary of test fishing sets and samples by gear type and statistical area.

Region	Vessel	Statistical Areas	Dates	# Sets Made	# Samples Processed
QCI	Queens Reach	2E	Mar 02 - Mar 31	17	12
	Southern Provider	2W	Mar 13 - Mar 31	5	1
QCI TOTAL				22	13
PRINCE RUPERT DISTRICT	Nita Maria	3, 4, 5	Mar 09 - Apr 03	32	23
	Pachena No 1***	5	Mar 18 - Apr 04	10	9
	Royal Pride*	3, 4, 5	Mar 17 - Apr 25	--	--
PRD TOTAL				42	31
CENTRAL COAST	Tara Lynn	6 - 10	Mar 06 - Mar 24	9	9
	Christav	6 - 10	Mar 09 - Apr 12	13	9
	Kynoc***	6 - 10	Mar 02 - Mar 31	18	17
	Ocean Explorer*	6 - 10	Mar 15 - Apr 13	--	--
	Lasqueti Star**	6 - 10	Mar 09 - Mar 31	--	--
CC TOTAL				40	34
STRAIT OF GEORGIA	Pachena No 1	13, 14, 15,	Feb 24 - Mar 08	14	11
	Tara Lynn	17	Feb 22 - Mar 18	18	10
	Angela Lynn	13, 14	Feb 22 - Mar 18	26	17
	Ocean Venture	14, 17	Feb 26 - Mar 22	37	27
	Endurance*	14, 17, 18	Feb 26 - Apr 03	--	--
	Native Joye*	14, 17,18	Feb 26 - Mar 31	--	--
	Snowdrift**	14,17, 18	Feb 24 - Mar 15	--	--
	Port Lincoln~	18	Mar 01 - Mar 31	--	--
	Dis. Huntress~	12	Mar 01 - Mar 31	--	--
	Lahaina Joye^	13			
		14, 17, 18			
GULF TOTAL				95	65
W COAST VANCOUVER ISLAND	Ocean Horizon	23, 24	Feb 21 - Mar 17	25	18
	Royal Viking***	23 - 27	Feb 24 - Apr 03	13	17
	Canadian Shore***	23 - 27	Feb 24 - Apr 03	12	1
	Ganges**	24	Feb 29 - Mar 23	--	--
	Southern Provider***	27	Feb 26 – Mar 09	6	7
WCVI TOTAL				56	44
TOTAL				255	187

* - Gillnet test and spawn assessment - no samples collected

** - Management platform - no samples collected

*** - Samples also collected from outside sources (e.g. SOK operators)

^ - Tagging platform - no samples collected

~ - Spawn survey and charter patrol – no samples collected

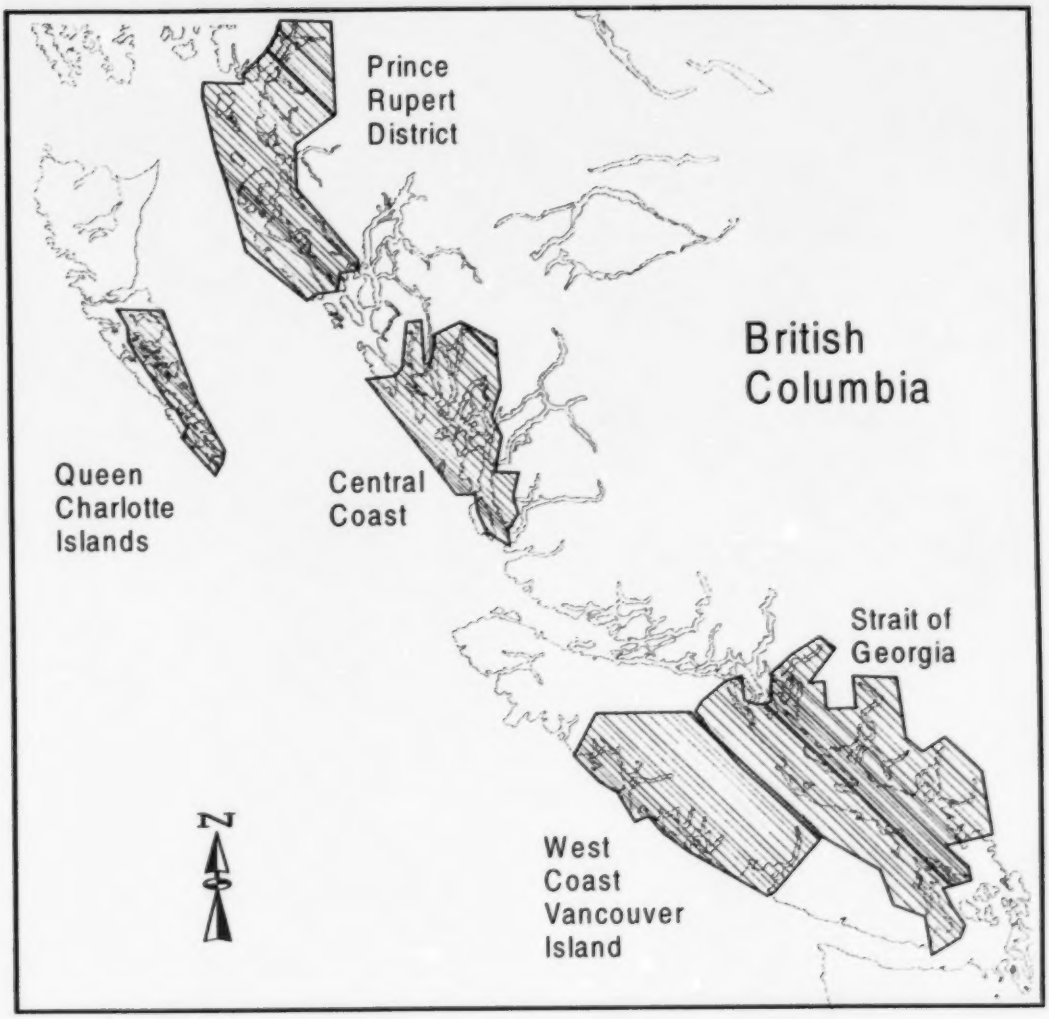

Figure 1. Herring stock assessment regions in British Columbia.

Figure 2. Statistical Area 2. Subareas 2-13, -15 and -16 were open for the seine fishery.

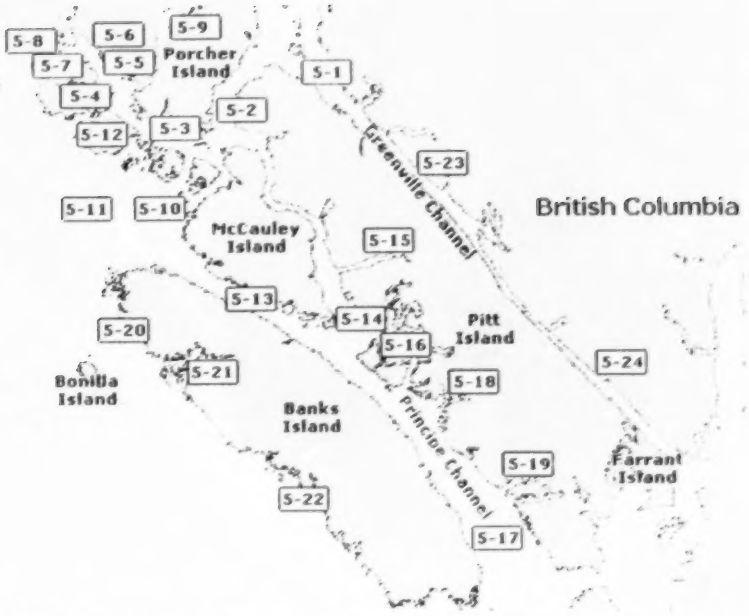

Figure 3. The Kitkatla seine fishery was in areas 5-3, -4, -5, -6, -7, and -8.

Figure 4. Statistical Area 3. The 2000 gillnet roe herring fishery took place in areas 3-2, -4, -5 and subareas in management area 4 (shown in Figure 5).

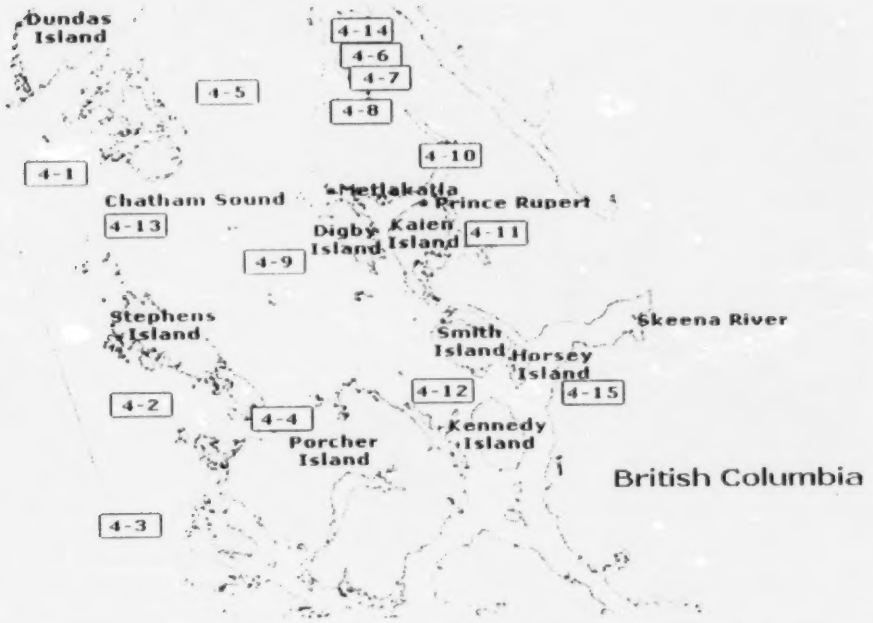

Figure 5. Statistical Area 4. In addition to the subareas from Figure 4, the gillnet fishery took place in 4-5, -6, -7, -8, -9, and -14.

Figure 6. Areas 7-8, -12, and -13 were opened for the 2000 Central Coast Roe Herring Seine fishery. Area 7-3 was opened for the gillnet fishery.

Figure 7. The 2000 Central Coast Gillnet Fishery took place in areas 6-16,6-17 and 7-3.

Figure 8. Statistical Area 14. All of Area 14 was open for gillnet and seine roe herring except 14-14, Comox Harbour.

Figure 9. Statistical Area 23. The 2000 roe herring seine fishery took place in 23-11 and portions of 23-9 and 23-10

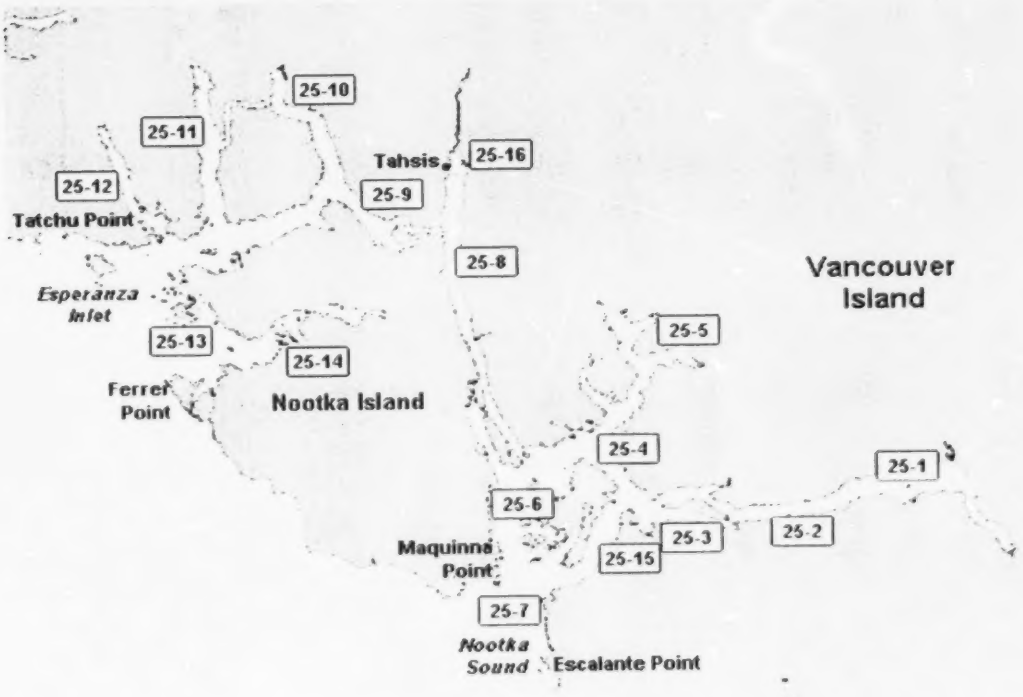

Figure 10. Statistical Area 25. The 200 gillnet roe herring fishery took place in sub-area 25-13.